

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 867 365 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.09.1998 Bulletin 1998/40

(51) Int. Cl.⁶: B64D 11/02

(21) Application number: 98200909.4

(22) Date of filing: 23.03.1998

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 24.03.1997 US 822030

(71) Applicant: THE BOEING COMPANY
Seattle, Washington 98124-2207 (US)

(72) Inventors:
• Hanay, James J.
Seattle, Washington 98103 (US)

• Laconte, Richard J.
Black Diamond, Washington 98010 (US)
• Lewis, Allan B.
Snohomish, Washington 98296 (US)
• Arnold, Peter J.
Seattle, Washington 98103 (US)
• Quan, William C.
Newcastle, Washington 98059 (US)

(74) Representative:
Land, Addick Adrianus Gosling et al
Arnold & Sledsma,
Advocaten en Octrooigemachtigden,
Sweelinckplein 1
2517 GK Den Haag (NL)

(54) Dual pivot expandable lavatory

(57) A dual pivot expandable lavatory (10) for use in limited spaces such as on an airplane. The lavatory may be positioned proximate the doorway area (11) of the airplane, and is provided with a primary (14) and a secondary (16) pivotable module. Each module is pivotably attached to a stationary assembly conventionally affixed to the ceiling and floor of the airplane. During take-off and landing both modules are locked, by means of a locking system (10), in a stowed position within the stationary assembly. During routine flight, the locking system is unlocked and both modules are pivoted into a deployed position within the doorway area. A flight attendant's seat (20) may be affixed to the exterior of the primary module. If the seat is used, an additional support foot is affixed to the primary module to accommodate the additional loading on the lavatory.

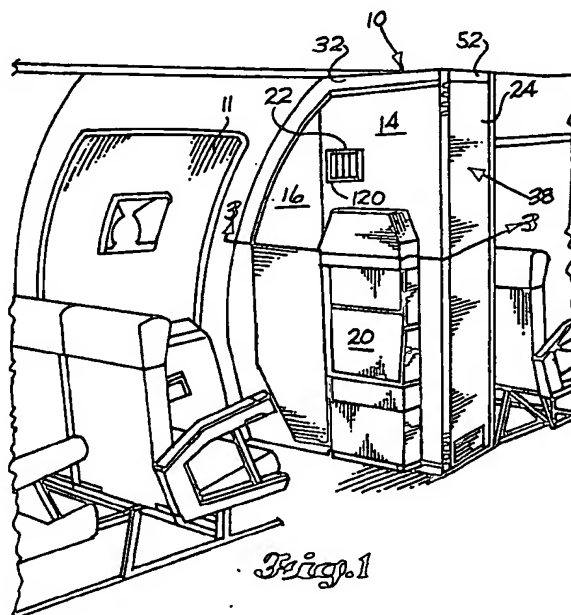


Fig. 1

EP 0 867 365 A2

Description

FIELD OF THE INVENTION

This invention relates to lavatories. More particularly, the present invention relates to an expandable lavatory for use anywhere space is limited, e.g., on board vehicles such as airplanes. Still more particularly, the instant invention relates to an expandable airplane lavatory that uses passenger doorway space when the airplane is in flight.

BACKGROUND OF THE INVENTION

Providing lavatories on board airplanes is widely known. For examples of fixed assembly lavatories provided on board airplanes, see U.S. Patent Numbers 5,150,863, issued September 29, 1992, to Hozumi; 4,884,767, issued December 5, 1989, to Shibata; 4,646,145, issued February 24, 1987, to Alie, and 4,589,463, issued May 20, 1986, to Ryan. However, the opportunities of doorway space utilization are not known to Hozumi, Shibata, Alie, or Ryan.

Doorway space utilization is the idea of making use of the floor areas and spaces immediately inboard of commercial airplane exit doors not needed during flight. Doorway areas and spaces are normally used only for entry and departure from the airplane while on the ground. The Federal Aviation Authority requires such areas and spaces for emergency exit and attendant assist purposes. However, during normal flight, these areas and spaces are largely unused.

By using doorway areas and spaces during routine flight, there exists an opportunity to increase seat count within an airplane. Seat count gains are the most direct way to increase a customer's perceived value of an airplane. Analysis indicates that each incremental seat added to an airplane of a given gross weight increases the value of the airplane at the time of sale by many hundreds of thousands of dollars. All things being equal, increasing seat count increases revenues, profit, and thus, perceived customer value.

Examples of apparatus providing increased space utilization on an airplane include an expandable volume lavatory disclosed in the aforementioned patent to Ryan and a convertible seat-bed disclosed in U.S. Patent Number 3,898,704, issued August 12, 1975, to Gallaher, et al. Also available for use on the McDonnell Douglas MD-11 commercial airplane is an accessible expandable lavatory for the physically impaired. When stowed, the lavatory is basically a conventionally sized module. When the need arises or on-demand, the lavatory can be expanded into the passenger doorway area to permit positioning of a wheelchair next to the toilet in the lavatory. However the McDonnell Douglas lavatory is not necessarily deployed during flight; only when there is a need to accommodate the needs of a physically impaired passenger.

SUMMARY OF THE INVENTION

An object of this invention is to provide a expandable lavatory for use in limited spaces.

Another object of the present invention is the provision of an expandable lavatory on board vehicles such as commercial airplanes.

Yet another object of the instant invention is the provision of a lavatory that can be expanded into the unused doorway space of an airplane.

Still another object of the present invention is to increase the revenue generating capability of a commercial airplane.

These and other objects of the present invention are achieved through the provision of a dual pivot expandable lavatory. The lavatory has a primary and a secondary pivoting module-pivotably attached to a stationary assembly. If used in an airplane, the stationary assembly may be conventionally affixed to typical floor and ceiling structure proximate a doorway of the airplane. During take-off and landing of the airplane, both modules are locked, by means of a locking system, in a stowed position within the stationary assembly. During routine flight, the locking system is unlocked and both modules may be pivoted into a deployed position within the space or area inboard of the doorway. Sufficient space is left for emergency exit of the airplane. Finally, a flight attendant's seat may be affixed to the exterior of the primary module and a locking foot assembly provided.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features and advantages of the present invention will become more readily appreciated by reference to the following detailed description of an embodiment of the invention and the accompanying drawings wherein like numbers refer to the same or similar parts and wherein:

FIG. 1 is an isometric view of the present expandable lavatory in a stowed position proximate a doorway of an airplane.

FIG. 2 is an isometric view of the instant lavatory in a deployed position.

FIG. 3 is a top view, taken along line 3-3 in FIG. 1. FIG. 3 includes a top view of an optional support foot assembly.

FIG. 4 is a top view, taken along line 4-4 in FIG. 2. FIG. 4 includes a top view of an optional support foot assembly.

FIG. 5 is a top view of the lavatory in a deployed position.

FIG. 6 is an simplified exploded isometric view of the expandable lavatory of the present invention.

FIG. 6A is an exploded isometric view of a corner post and hinge subassemblies used in the present invention.

FIG. 7 is a cut away view showing the interior of the present lavatory.

FIG. 8 is a partial perspective view illustrating the interface between the secondary pivoting module and the toilet when the lavatory is in a deployed condition.

FIG. 9 is a partial perspective view illustrating the interface between the secondary pivoting module and the toilet when the lavatory is in a stowed position.

FIG. 10 is one embodiment of the plumbing and other equipment positioned within the primary pivoting module of the present invention.

FIG. 11 is another embodiment of the plumbing and other equipment positioned within the primary pivoting module of the present invention.

FIG. 12 is a perspective view, looking from the outboard to the inboard of the airplane, showing the locking system of the present invention. FIG. 12 also provides a perspective of an optional support foot assembly.

FIG. 13 is an enlarged perspective view showing the upper portion of the locking system of FIG. 12.

FIG. 14 shows a top view of the upper portion of the locking system of FIG. 12.

FIG. 15 shows the other side of the upper portion of the locking system of FIG. 12.

FIGS. 16 and 17 show the support foot assembly in a locked and unlocked position, respectively.

FIGS. 18 and 19 are side views taken along lines 18-18 and 19-19 in FIGS. 16 and 17, respectively.

FIGS. 20, 21 and 22 show three stages in the deployment (and stowage) of the present dual pivot expandable lavatory.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIGS. 1 and 2, the present expandable lavatory 10 is shown disposed proximate the exit door 11 of an airplane (not shown). As used herein, the terms outboard, inboard, fore and aft have the same meanings ordinarily attributed to these words in an airplane.

The dual pivot expandable lavatory 10 comprises a fixed or stationary sidewall lavatory subassembly 12, a primary pivoting module 14, a secondary pivoting module 16, a locking system 18 (not shown in FIGS. 1 or 2, but see FIG. 5 and more particularly FIGS. 12 - 18) and an optional flight attendant's seat 20.

The lavatory 10 is in the stowed position shown in FIG. 1 when the airplane is on the ground, taxiing, during takeoff, climbout and landing. While on the ground, passengers may be loaded on the airplane or deplaned and operations conducted in a routine manner.

After takeoff and climbout, an attendant would unlock the primary module 14 manually using a latch grab handle 22 and deploy both the primary module 14 and the secondary module 16 into the area or space

proximate the doorway 11, as shown in FIG. 2. Once extended, the primary module 14 is relocked, using the latch grab handle 22, in the deployed position. While deployed, access to the inside of the lavatory 10 is through a conventional door whereby the lavatory is available for passenger and crew use.

FIGS. 3 and 4 show cross sectional views of the expandable lavatory 10 in the stowed and deployed positions, respectively. As shown in FIG. 3, a conventional sink cabinet 26 and other components are carried by the primary module 14. These components are completely located within the envelope of the stationary sidewall lavatory subassembly 12 proximate a toilet 28 when the lavatory 10 is in a stowed position. When the lavatory is in a deployed state, as shown in FIG. 4 (also see FIG. 7), passengers should not perceive any significant difference between the instant lavatory and a conventional lavatory.

As shown in the top view of FIG. 5, sufficient space remains in the area proximate the doorway 11 for any needed egress. However, in the event of an inflight emergency or during landing preparations, an attendant ordinarily would unlock the primary module 14, pivot it and the secondary module 16 back into the sidewall lavatory subassembly 12, and relock the lavatory 10 in the stowed position shown in FIG. 1. Before the expandable lavatory is stowed, a visual inspection of the interior of the lavatory would be required to ensure that it is unoccupied and free of blockage items. The expandable lavatory 10 would ordinarily remain stowed during final approach and landing. After the airplane has parked at the airport gate, crews could redeploy and service the lavatory 10, as appropriate.

Turning now to FIG. 6, there is shown a simplified exploded perspective view of the dual pivot expandable lavatory 10 of the present invention. The stationary or fixed subassembly 12 is essentially a box configured to coincide with the interior contour of the airplane. The box has a width (fore and aft) which is considerably less than conventional lavatories. For example, a conventional lavatory has a width of between thirty three (33) inches to about thirty six (36) inches. In contrast, the present lavatory 10 is about twenty two (22) inches wide when in a stowed position.

The stationary subassembly 12 is intended to be placed outboard of an aisle of the airplane, but may be suitably positioned anywhere in the airplane. As is obvious the subassembly and thus the lavatory 10 may be repositioned in a direction opposite to that shown.

The fixed subassembly 12 comprises an outboard wall 30, an open aft side wall 32 which permits the pivoting and stowage of the primary module 14 and the secondary module 16, a solid forward side wall 34, a hollow corner post 36, an aisle "wall" 38, a conventional lavatory door 24, a fixed floor pan 40, a ceiling 42 and a plurality of conventional lavatory mounts 44 and 46.

The toilet 28 is affixed to the floor pan 40. The outboard wall 30 supports an amenities console 45 above

the toilet. The amenities console may contain seat covers, facial tissues, air sick bags and sanitary napkins (not shown). The outboard wall 30, open side wall 32 and the solid side wall 34 are attached to suitable air-plane structure, such as in the flooring and ceiling, by the conventional lavatory mounts 44 and 46.

Affixed to the open side wall 32 is the corner post 36 to which the primary module 14 is pivotably attached as better shown in and discussed below with respect to FIG. 6A. Also see FIGS. 3 and 4. In addition to the corner post 36, the aisle "wall" 38 comprises a returned edge 48 (see FIGS. 4 and 5) on the forward side wall, a threshold 50 and a header 52. The lavatory door 24 is suitably hinged by a conventional means, not shown, to the corner post 36.

While not shown in FIG. 6A (but see FIGS. 3 and 4), the primary module 14 is pivotably attached to the corner post 46 by means of a pair of hinge subassemblies 48 disposed at the upper and lower portions of the corner post 46. The hinge subassembly disposed at the upper portion of the corner post 46 is shown in exploded form detail in FIG. 6A whereas the lower hinge subassembly is shown installed in the corner post 46. Each hinge subassembly 48 comprises a fixed mounting plate 54 suitably attached within a recess formed in the post 46, a pivoting mounting plate 56, thrust bearings 58 and a conventional hinge pin 60. The pivoting mounting plate 56 is pivotably attached to the fixed mounting plate by means of the thrust bearings 58 and the hinge pin 60. In turn, the pivoting mounting plate 56 attaches to the primary pivoting module 14 as shown in a simplified way in FIGS. 4 and 5.

The open wall has an outline 62 which is configured to accommodate the shapes of both the primary pivoting module 14 and the secondary pivoting module 16 whereby in use both modules may be positioned in a stowed and a deployed position. Except for a slot 64 which cooperates with the locking system 18 to be described later, the edge of the perimeter of the outline 62 is provided with an elastomeric seal 66. The seal 66 is provided on both the exterior surface and the interior surface of the edge of the outline 62 and cooperates with complementary surfaces of the primary pivoting module 14 and the secondary pivoting module 16 so that in use no objectionable odors or noise are detectable from the lavatory. The seal 66 also permits an occupant of the lavatory 10 to have privacy when the lavatory is in its deployed position.

As perhaps best shown in FIGS. 3 and 4, the toilet 28 is offset toward the expanding side of the lavatory 10. This offset provides an occupant with sufficient shoulder space when the lavatory 10 is in an expanded or deployed state. As shown in FIG. 9, the undersurface of a toilet shroud 68, which is attached to the outboard wall 30, stops above the lower portion of the secondary pivoting module 16 and the floor pan 40 which is fixed within the stationary subassembly 12. The undersurface of the shroud 68 and the floor pan 40 are shaped or con-

toured to receive the secondary pivotable module 10 when the lavatory 10 is in a stowed position.

As shown in FIG. 6, the primary pivoting module 14 comprises a primary moving wall 70 having a shape complementary to the inboard portion of the outline 62 and having a dimension that is slightly greater than that outline portion. The primary moving wall 70 is attached to the pivoting mounting plates 56 and is suitably attached to a top panel 72 and a bottom panel 74. In a deployed position, an upper flange 75 formed on the top panel 72 and a lower flange 77 formed on the bottom panel 74 press against the seal 66 on the interior edge of the outline 62 and assist in forming the conventional looking lavatory 10 shown in FIG. 7.

The primary pivoting module 14 also comprises a primary shell 76 which is somewhat smaller than the primary moving wall 70 thereby forming a primary moving wall overlap 78. As shown in FIG. 6, the primary shell 76 may be made integral with the top panel and the bottom panel. A lip 79 extends along the outboard exterior edge of the shell 76 from the bottom panel 74 to the top panel 72. An elastomeric center seal 81 is disposed over the lip 79 and cooperates with the perimeter seal 66 formed over the outline 62 in the open wall 32 to mitigate undesirable odors and noises.

As shown in FIGS 7 and 10, suitably affixed within the primary shell are typical amenities and a plumbing system 83. The amenities may include a sink cabinet 80, a trash receptacle 82, mirror 84, light 86, and other typical amenities, such as cups, soap, hand towels, not shown in FIG. 7. FIG. 10 illustrates the plumbing system 83 which comprises a conventional supply line 88, supply valve 90 for both the sink cabinet 80 and the toilet 28, toilet drain valve 92, water heater 94, water filter 96, hot and cold valves 96, 98, a system drain valve 101, and a gray water plumbing subsystem 102. The gray water plumbing subsystem could either include an optional sump 103 or a separate system drain line 104. An alternative configuration 83' for the plumbing system used in connection with the present invention is shown in FIG. 11.

As will be seen, the primary module 14 cooperates with the secondary pivoting module 16 to form the lavatory 10 of the present invention. The secondary module comprises a secondary moving wall 104, a secondary shell 106 having a continuous flange 108 about its interior periphery, guide rollers 110 mounted on the inboard edge of the secondary moving wall 104 (see FIGS. 8 and 9) and a conventional continuous pivotable hinge (not shown).

The secondary moving wall 104 is pivotably attached by the continuous pivotable hinge to the outboard portion of the outline 62 of the open wall 32 and is sized to slightly overlap the outline when the lavatory 10 is in a stowed position. The inboard edge 112 of the secondary moving wall 104 is configured as a recessed flange 108 which sealingly cooperates with and is covered by the primary moving wall overlap in a stowed

position. In that stowed position, the secondary module 16 is trapped between the primary moving wall overlap and the open wall 32. As a consequence, the primary moving wall and the secondary moving wall present, in the stowed position, a substantially continuous, smooth surface to the airplane passengers.

As alluded to above, when stowing the present expandable lavatory 10, the secondary shell 106 of the secondary pivotable module 16 slides under the toilet shroud 68 and above the floor pan 40; see FIG. 9. When in the deployed position, the secondary shell 106 is placed in intimate contact with the perimeter seal 66 formed over the edge of the outline; see FIGS. 7 and 8. In that deployed position, the secondary shell flanges 108 stop against the perimeter seal 66 on the inside surface of the open wall preventing further outward movement of the secondary module 16. The center seal 81 on the primary shell 76 makes contact with the inboard edge of the secondary shell 106 preventing movement of the secondary shell inwardly toward the stationary subassembly 12.

The locking system 18 fixedly positions the primary module 14, and thus the secondary module 16, in either a stowed or a deployed position. It must be released before the primary module and secondary module can be pivoted. FIG. 12 shows a portion of the primary pivotable module 14 in a stowed and locked position proximate the open wall 32. As shown in the somewhat simplified view of FIG. 12, the locking system 18 comprises a torque tube 112 and similar upper and lower locking system subassemblies 114 disposed at the top and bottom panels 72, 74 of the primary pivoting module 14.

As is better illustrated in FIGS. 13 - 15, the torque tube 112 is rotatably supported on the interior surface of the primary movable wall 70. A pin 116, provided at the distal ends of the torque tube 112, is offset from its centerline. A latch grab handle 118 (shown in solid lines in FIG. 12 and in phantom in FIG. 13) is suitably affixed to the torque tube 112. The grab handle 118 is accessible by a flight attendant from the exterior of the primary movable wall 70 and is attached to the torque tube 112 through a recessed escutcheon 120. The escutcheon 120 is formed on the outside of the primary movable wall 70. See FIGS. 1 and 2.

Since both locking system subassemblies 114 are similar, the following discussion will focus on the upper subassembly. The upper locking subassembly is pivotally attached to the top panel 72 of the primary movable module 14 and comprises a pivotable arcuately-shaped main rocker arm 122.

The rocker arm 122 comprises a raised rail 124, a rocker arm bearing 126, an elongated pit slot 128 disposed proximate the primary moving wall and a hook-shaped recess 130 disposed proximate the deployed position stop. The rocker arm bearing is positioned about a pin affixed to the top panel of the primary pivotable module whereby the rocker arm may be pivoted in

use. As perhaps best seen in FIGS. 14 and 15, the upper offset pin of the torque tube is inserted into the pin slot on the main rocker arm.

The upper locking subassembly also comprises a safety stop subassembly. As best shown in FIGS. 13 and 15, the safety stop subassembly comprises a guide arm and a safety stop arm which act together as one unit. The guide arm is inserted through slots formed in the raised rail and extends from the pin slot to the hook shaped recess of the arcuate rocker arm. The guide arm is pivotally attached to the rocker arm by means of a pin located within the raised rail at a position intermediate its distal ends.

During movement between the stowed and deployed positions of the lavatory 10, the raised rail on the main rocker arm moves through the slot in the outline edge of the open wall. One of the edges of the slot forces the guide arm against a guide arm spring to align with the raised rail thus positioning the safety stop arm against an offset stop affixed to the upper portion of the torque tube below the offset pin. The safety stop subassembly prevents the torque tube from turning and thus locks the main rocker arm in line with the slot formed in the sealed edge of the open wall. The purpose of the safety stop subassembly is to prevent inadvertent closing of the grab handle which would cause a jamming condition.

The basic concept of the present locking system is quite simple. It is analogous to a stick placed in the track of a sliding window to block it in either a closed or open position. Once the stick is removed, the window can be moved. In the present invention, the main rocker arm functions as the stick and the deployed position stop on the top panel and the stowed position stop formed on the primary moving wall each functions, by analogy, as the window frame.

Referring now to the stowed position shown in FIGS. 12-14, in use, the grab handle 118 lays flat in the escutcheon 120 whereby when a flight attendant pulls the grab handle outward, the torque tube turns accordingly (counter clockwise). As a result, the offset pins pivot the rocker arm away from a position where the rocker arm is lodged against an edge of the slot formed in the open wall whereby the raised rail may be aligned with the slot formed in the sealed edge of the open wall. The primary pivoting module is then free to pivot between the deployed position stop on the top panel and the stowed position stop formed on the primary moving wall.

A single flight attendant seat may optionally be affixed to the exterior of the primary moving wall of the primary pivotable module. See FIGS. 1 and 2. If used, the attendant's seat must always face aft and requires a support foot assembly which transfer loads downwardly to the floor structure. The support foot assembly is disposed on the lower exterior of the primary moving wall proximate the airplane flooring. The optional support foot assembly is not shown in FIGS. 1 or 2, but is in

FIGS. 3 and 4.

The support foot assembly is best illustrated in FIGS. 16-19 as comprising a support foot housing, a lockable foot slidably positioned within the housing, a bottom leg pivotably pinned to the slidable foot as by a bottom pin, a top leg pivotably pinned by means of a center pin to the bottom leg and securely affixed to a top leg shaft supported by the support foot housing. The support foot assembly also comprises a support foot control arm securely affixed to the top leg shaft. The control arm is pinned to a swivel end link pinned to a control arm affixed to the main rocker torque tube.

In use, the support foot is moved off the floor only when the locking system is disengaged allowing the primary module to pivot. More particularly, in use, the support foot assembly is controlled by the link connected to the main rocker torque tube. When the shaft is rotated counter clockwise to disengage the lock system, the control arm pushes the link outboard as shown in FIG. 16 which pushes the foot support control arm towards the right in that figure. The control arm thus pivots in a counterclockwise direction thereby rotating the top leg in an upward direction as viewed in FIG. 16. As the upper leg rotates upwardly, it pulls the bottom leg upwardly through the center pin which causes the support foot to slide upwardly within the support foot housing as is best seen in FIG. 18. To engage the support foot, the process is reversed as is perhaps best seen in FIGS. 17 and 19. In the engaged position, the top and bottom legs are positioned past the center of their pivot points and stop against the inside of the support foot.

Assuming that the lavatory is in the stowed, locked position of FIG. 20 and a flight attendant wishes to deploy the unit, the grab handle is pulled to the substantially perpendicular out position shown in FIGS. 12, 13 (in phantom) and 14. This is a clear visual indication that the locking system is disengaged. The primary module may then be pulled out of the stationary assembly by the attendant.

As seen in FIG. 21, the pivoting motion of the primary module pushes the secondary module outward as the secondary module rolls over the primary shell by means of rollers disposed on the inboard edge of the secondary moving wall (see FIGS. 3 and 4, but especially FIGS. 8 and 9). Both modules continue outward until the secondary module stops in place when the perimeter flange is pulled against the sealed edge of the open wall; see FIG. 21. The primary module continues to move outwardly to the fully deployed position shown in FIG. 22 wherein the lock stops are positioned against the perimeter seals and the center seal is positioned against the secondary shell.

The flight attendant returns the grab handle to a position within the escutcheon and the lock is re-engaged. The expandable lavatory is now ready for use. Stowing of the lavatory is a reverse of the above wherein the locking assembly is disengaged, the unit is pushed closed by the attendant and the locking assembly is re-engaged.

bly is re-engaged.

While the principles of this invention have been described in connection with specific embodiments, it should be understood clearly that these descriptions are made only by way of example and are not intended to limit the scope of the invention.

Claims

1. An expandable lavatory comprising:

- (a) a stationary assembly having a substantially open side wall and a corner post attached to said side wall;
- (b) a toilet assembly affixed within said stationary assembly;
- (c) a primary module pivotably attached to said corner post, said primary module being movable within said side wall from a stowed position substantially within said stationary assembly to a deployed position substantially outside of said stationary assembly;
- (d) locking means for securing said primary module within said lavatory in said stowed position and in said deployed position, and
- (e) a secondary module pivotably attached to said side wall and being movable within said side wall from a stowed position substantially within said stationary assembly to a deployed position substantially outside of said stationary assembly, said secondary module being provided with means for urging movement of said secondary module when said primary module is moved.

2. An expandable lavatory disposed in an airplane, said airplane having a passenger doorway area, said lavatory comprising:

- (a) a stationary assembly disposed proximate said passenger doorway area, said stationary assembly comprising a side wall, a corner post affixed to said side wall and a lavatory door pivotably attached to said corner post;
- (b) a toilet assembly affixed within said stationary assembly away from said lavatory door;
- (c) a primary module pivotably attached to said post, said primary module being movable within an opening formed in said side wall from a stowed position substantially within said stationary assembly to a deployed position substantially outside of said stationary assembly within said doorway areas;
- (d) locking means for security said primary module within said lavatory in said stowed position and in said deployed position, and
- (e) a secondary module pivotably attached to said side wall and being movable within said

opening from a stowed position substantially within said stationary assembly to a deployed position substantially outside of said stationary assembly within said doorway area, said secondary module being provided with means for urging movement of said secondary module when said primary module is moved. 5

3. A process for using unused doorway space proximate a doorway disposed in an airplane, said process comprising: 10

(a) disposing a stationary assembly proximate said passenger doorway area, said stationary assembly comprising a side wall having an opening, a corner post affixed to said side wall and a lavatory door pivotably attached to said corner hinge subassembly; 15

(b) affixing a toilet assembly within said stationary assembly away from said lavatory door; 20

(c) pivotably attaching a primary module to said corner post;

(d) pivotably attaching a secondary module to said side wall;

(e) providing said secondary module with means for urging movement of said secondary module when said primary module is pivoted 25

(e) locking said primary module and said secondary module within said lavatory in a stowed position substantially within said stationary assembly; 30

(f) unlocking said primary module and said secondary module when said airplane is in normal flight,

(g) moving each of said modules within said opening from said stowed position to a deployed position substantially outside of said stationary assembly within said doorway area. 35

4. A process for increasing the revenue generating capacity of an airplane, said airplane having a doorway area and a plurality of passenger seats, said process comprising: 40

(a) positioning an expandable lavatory which is narrower than a conventional lavatory proximate said doorway area whereby space within said airplane may be saved; 45

(b) providing said lavatory with a pivotable primary module and a pivotable secondary module which may be deployed within said doorway area, and 50

(c) increasing the number of passenger seats within said airplane. 55

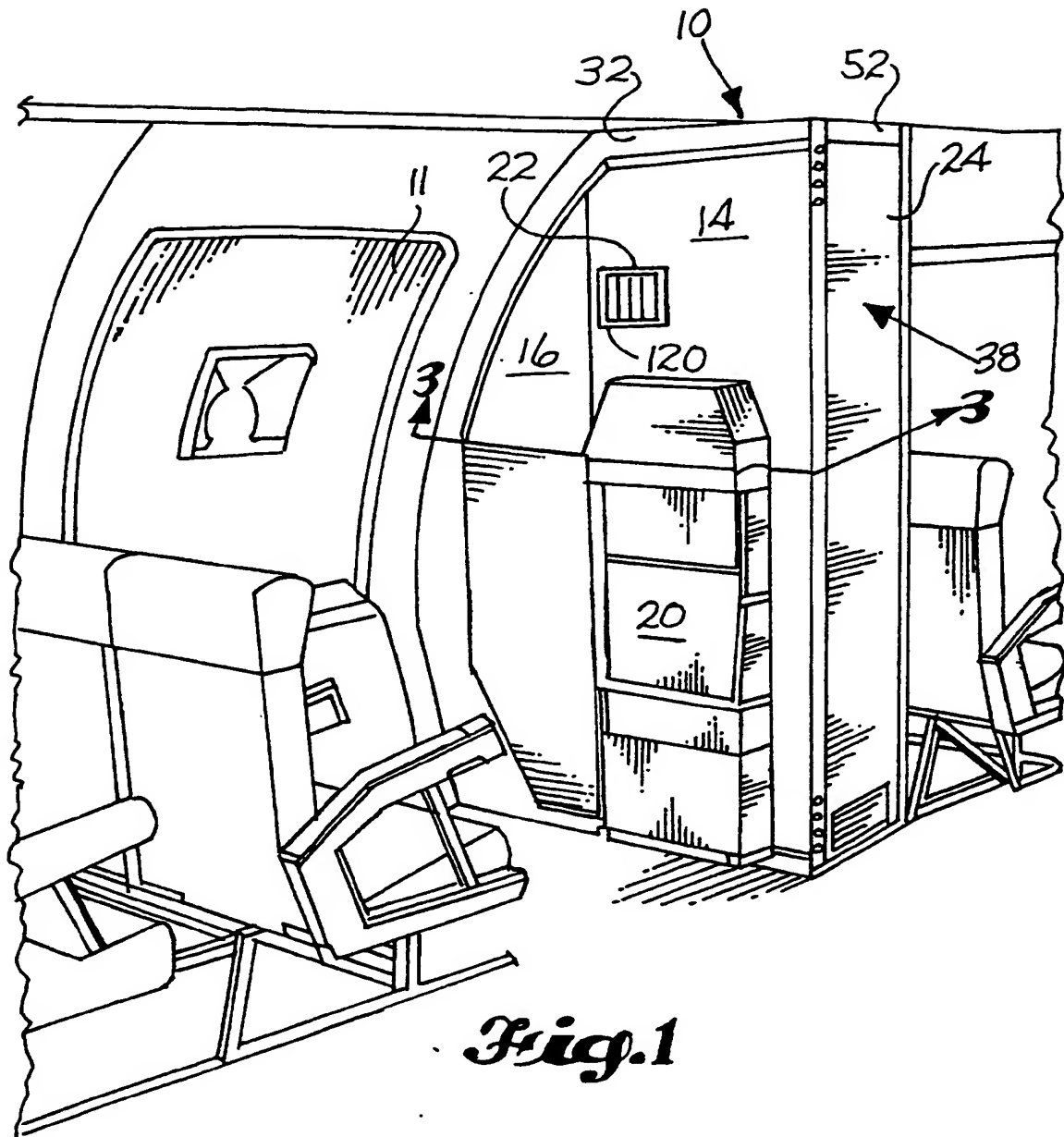


Fig. 1

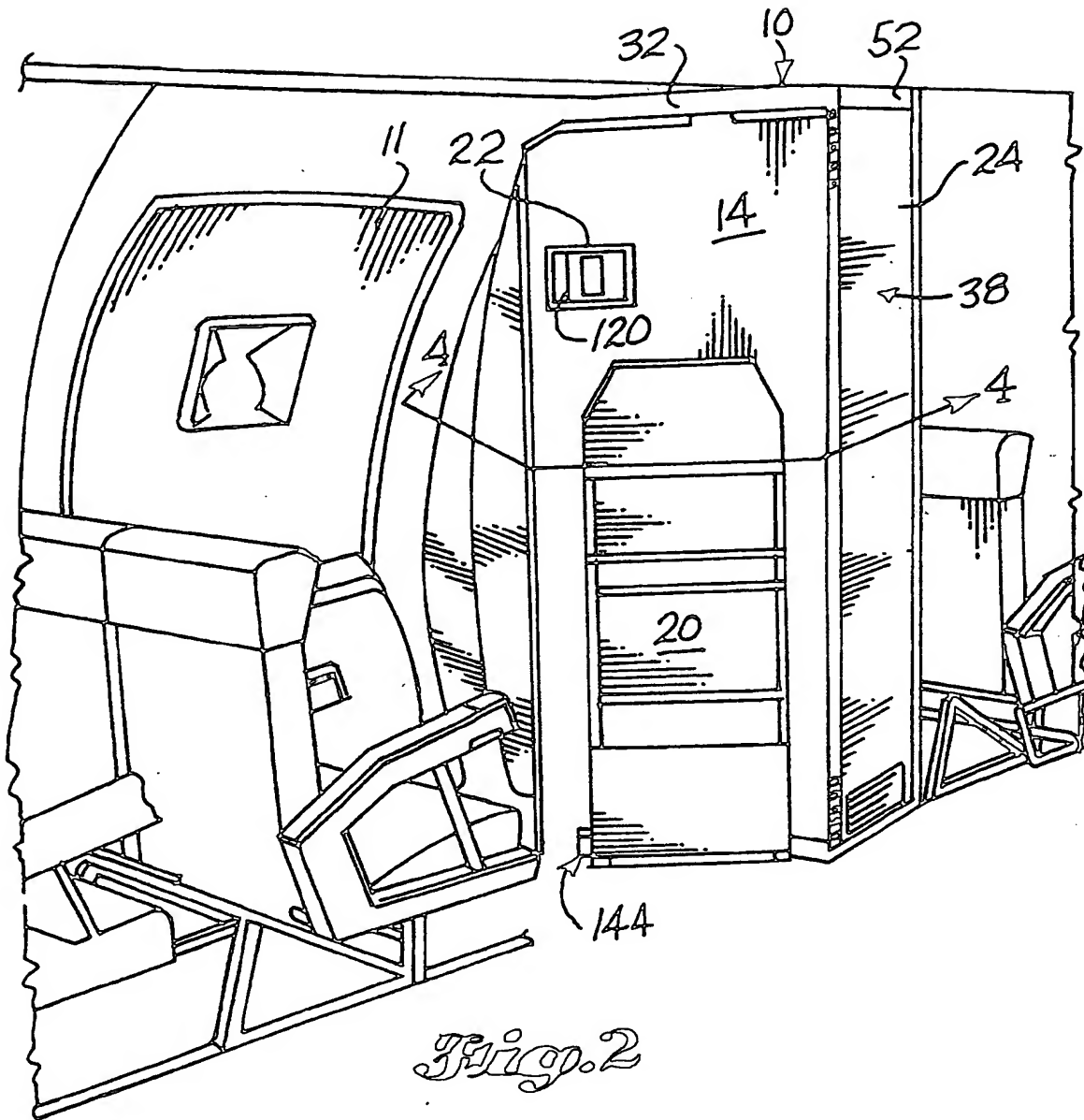


Fig. 2

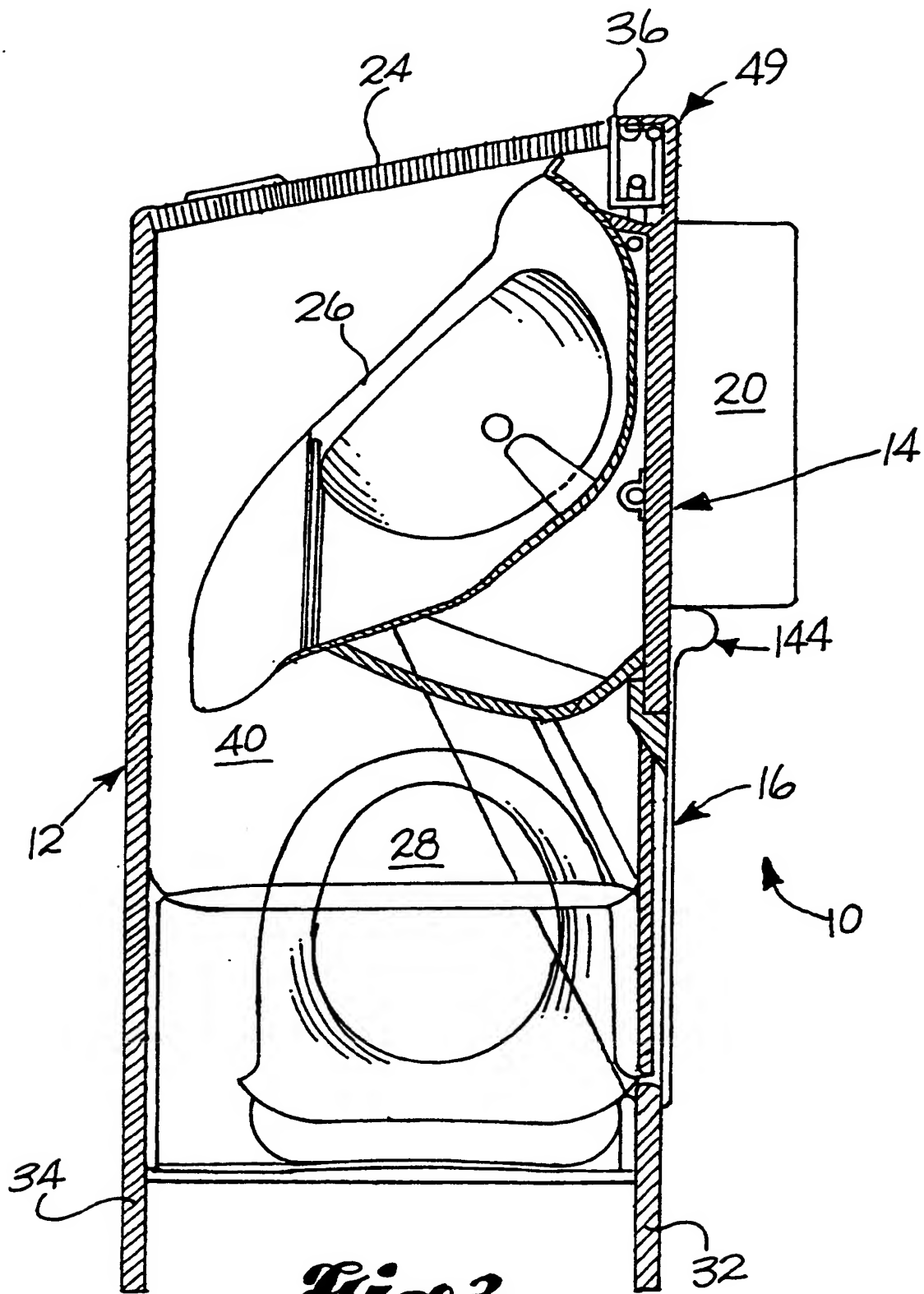


Fig.3

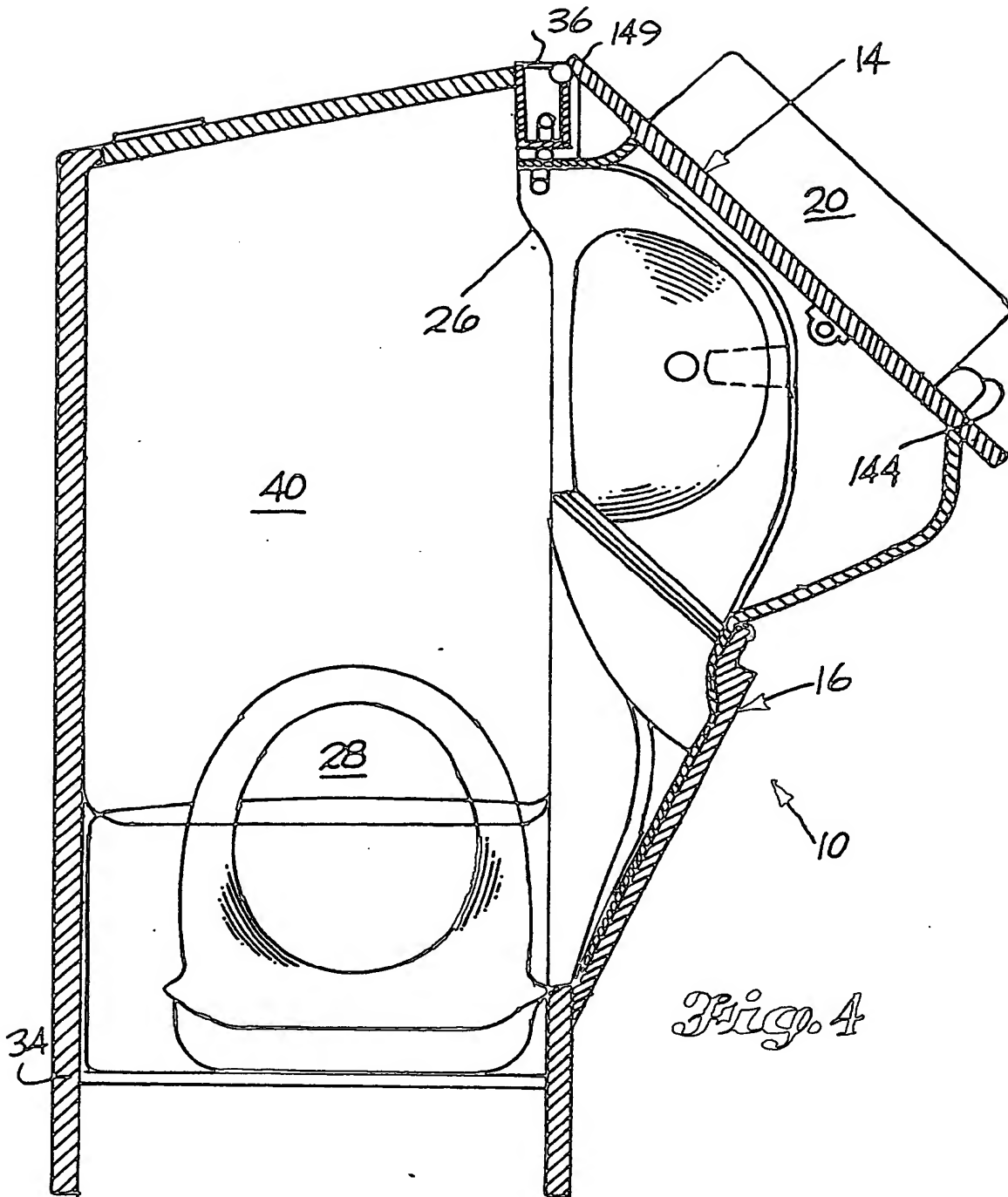
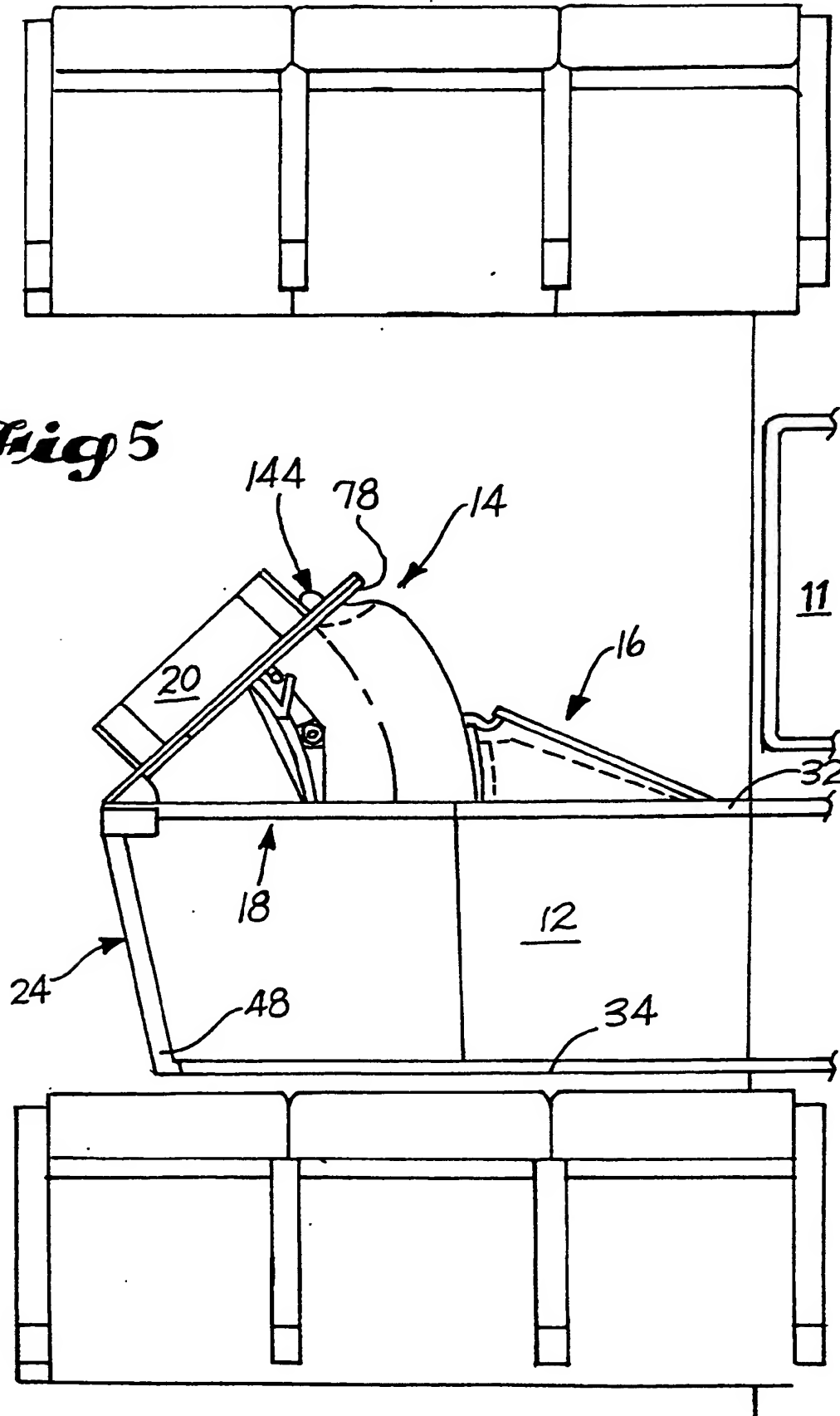
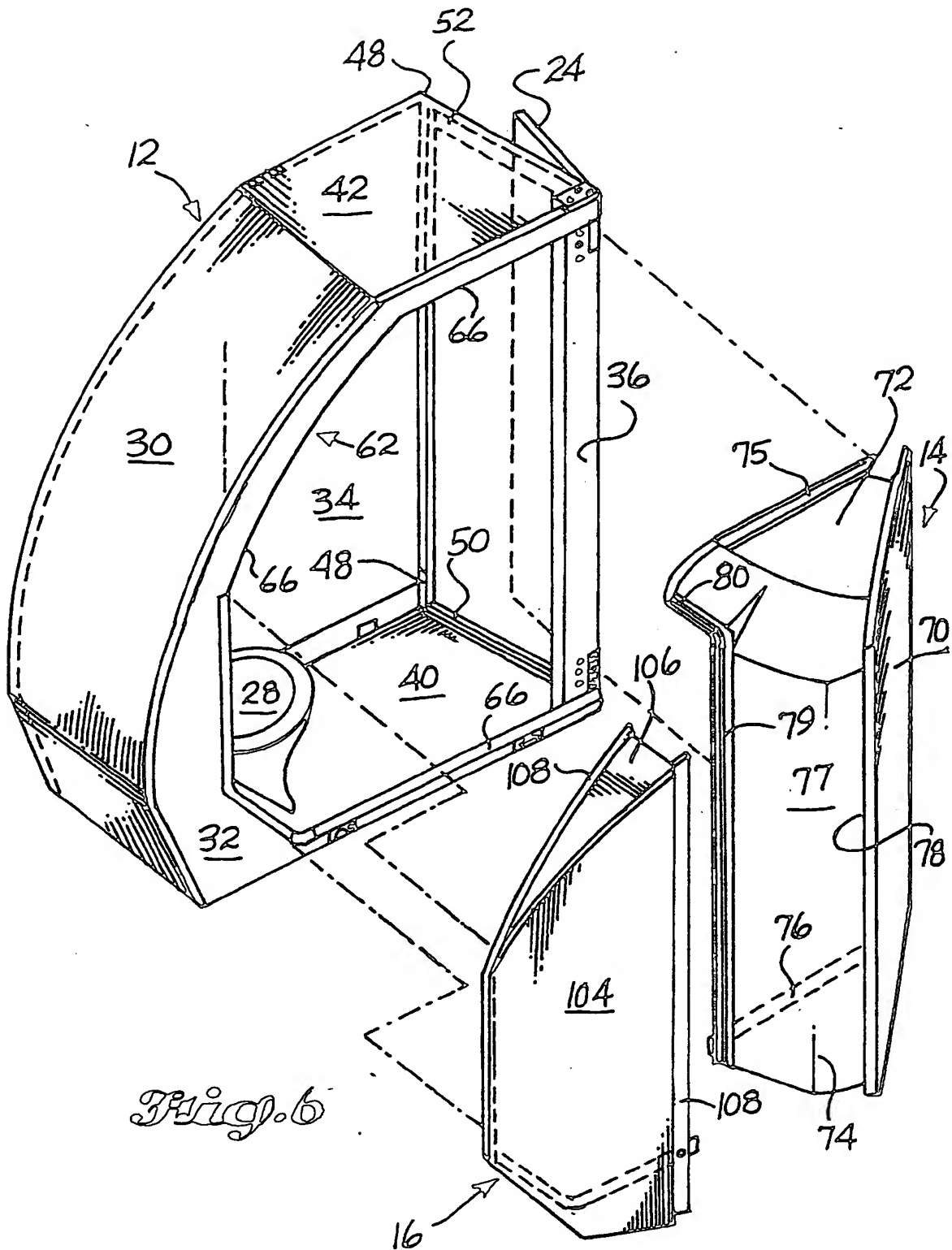
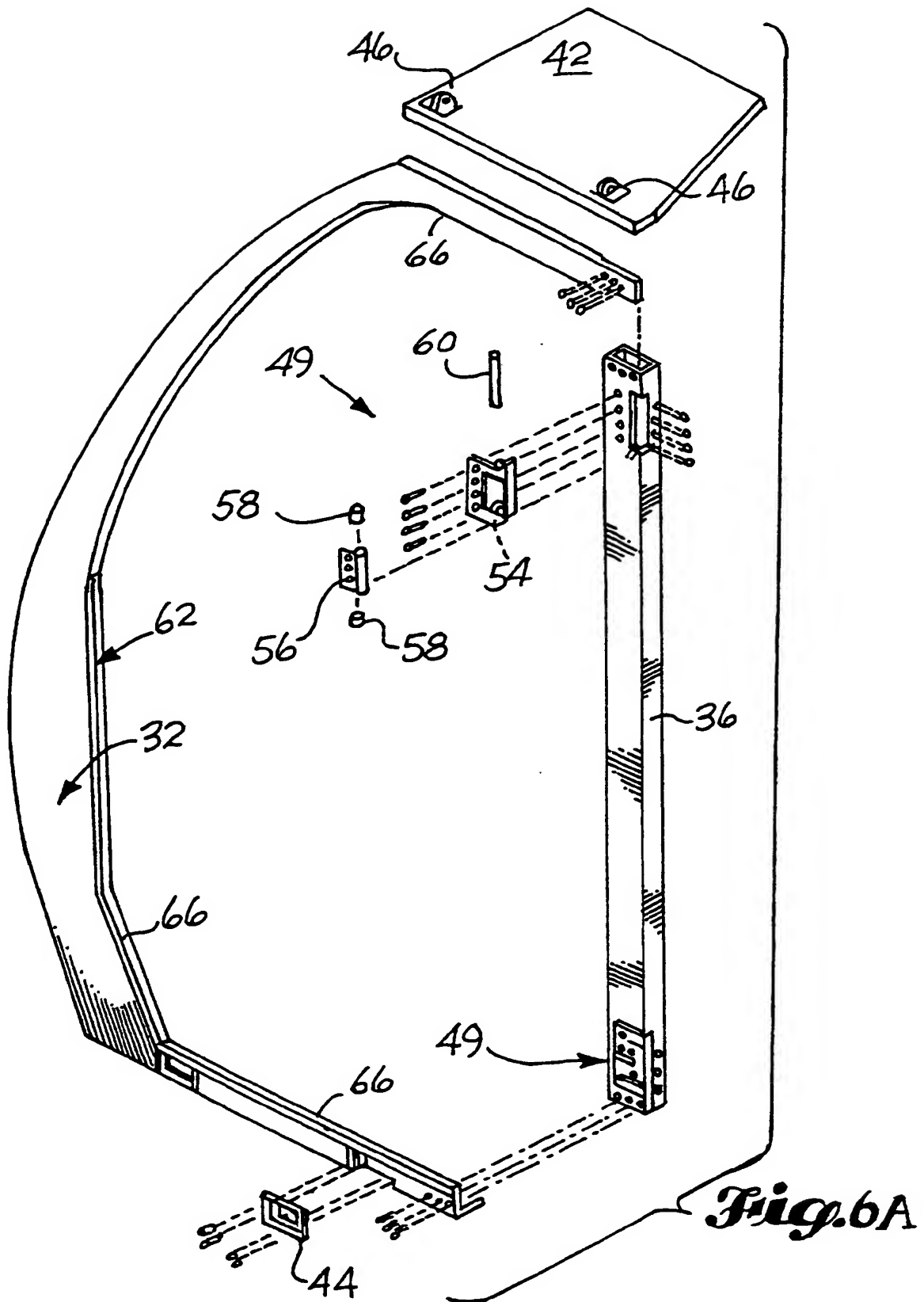
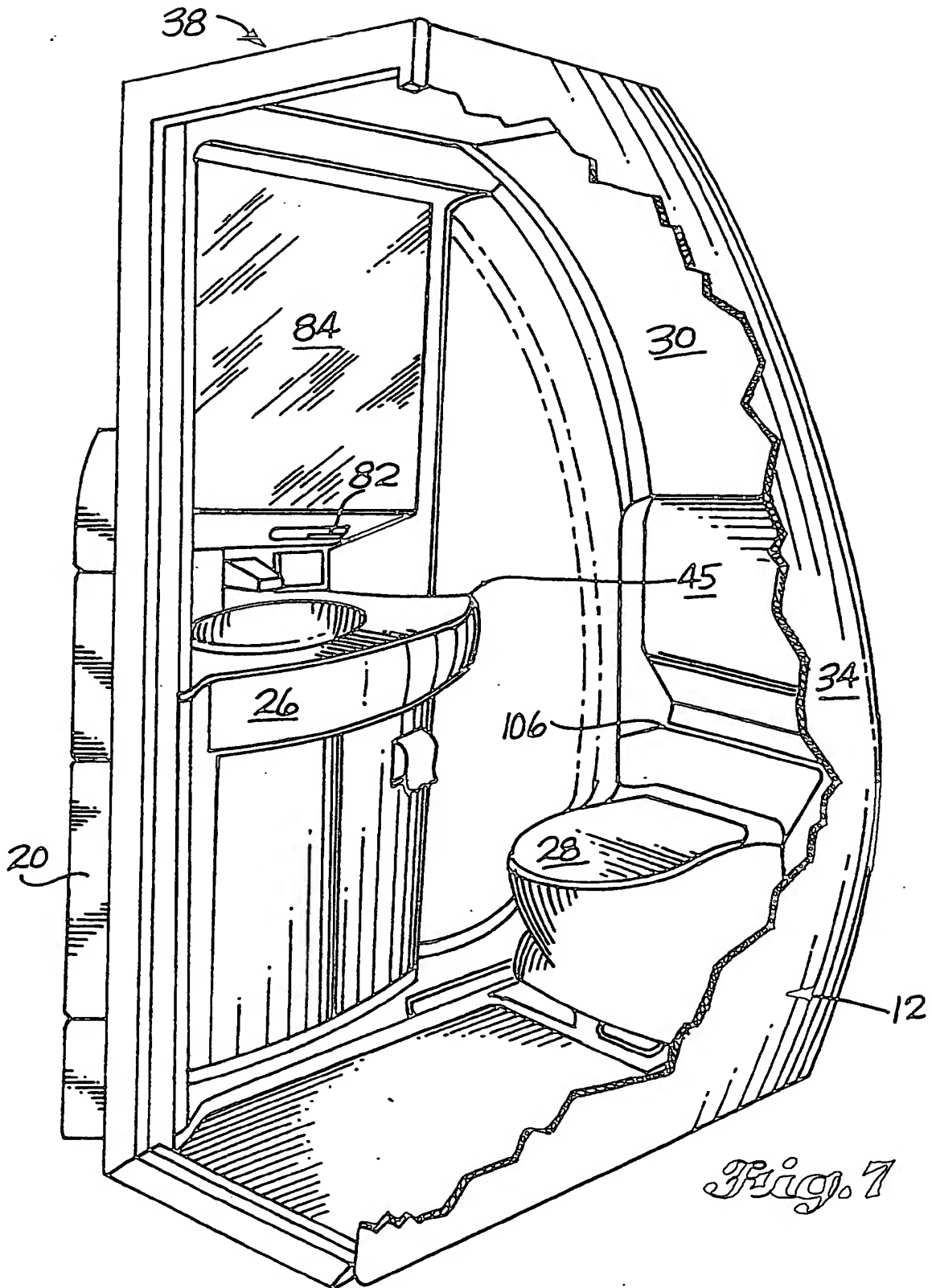


Fig 5









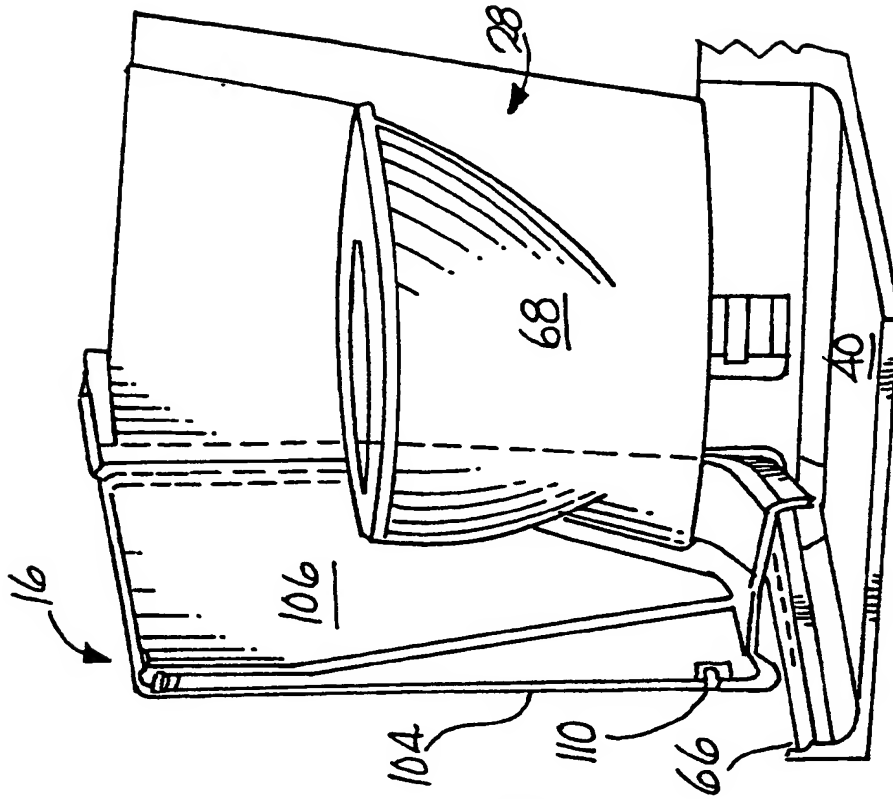


Fig. 9

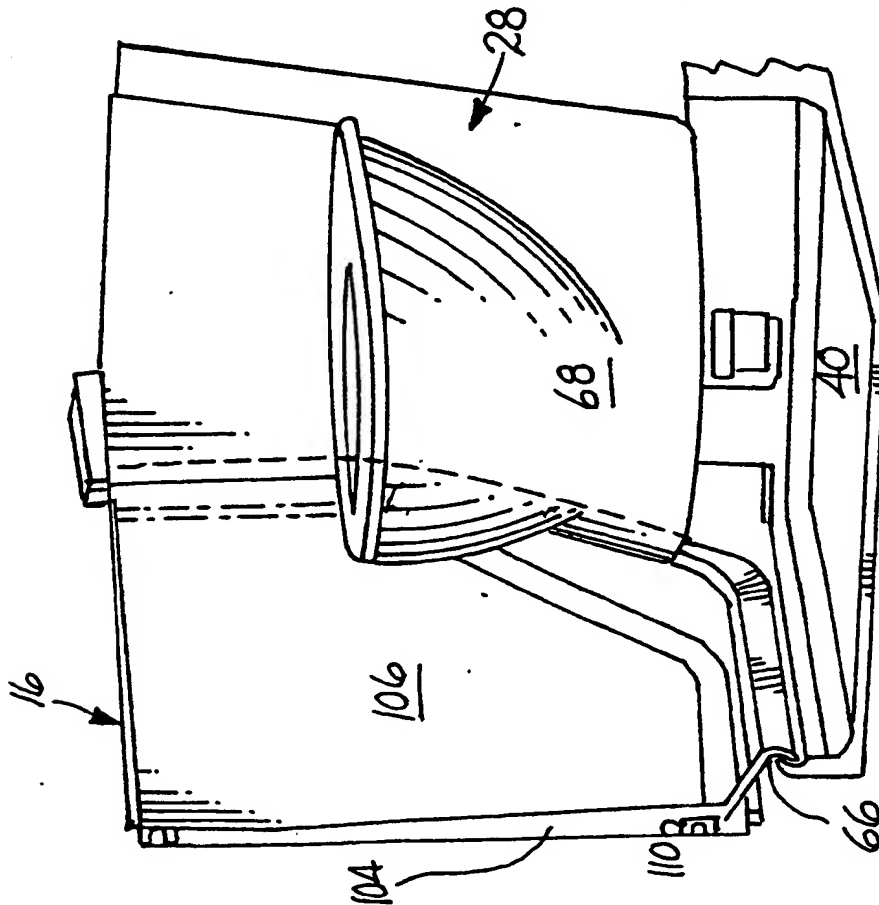


Fig. 8

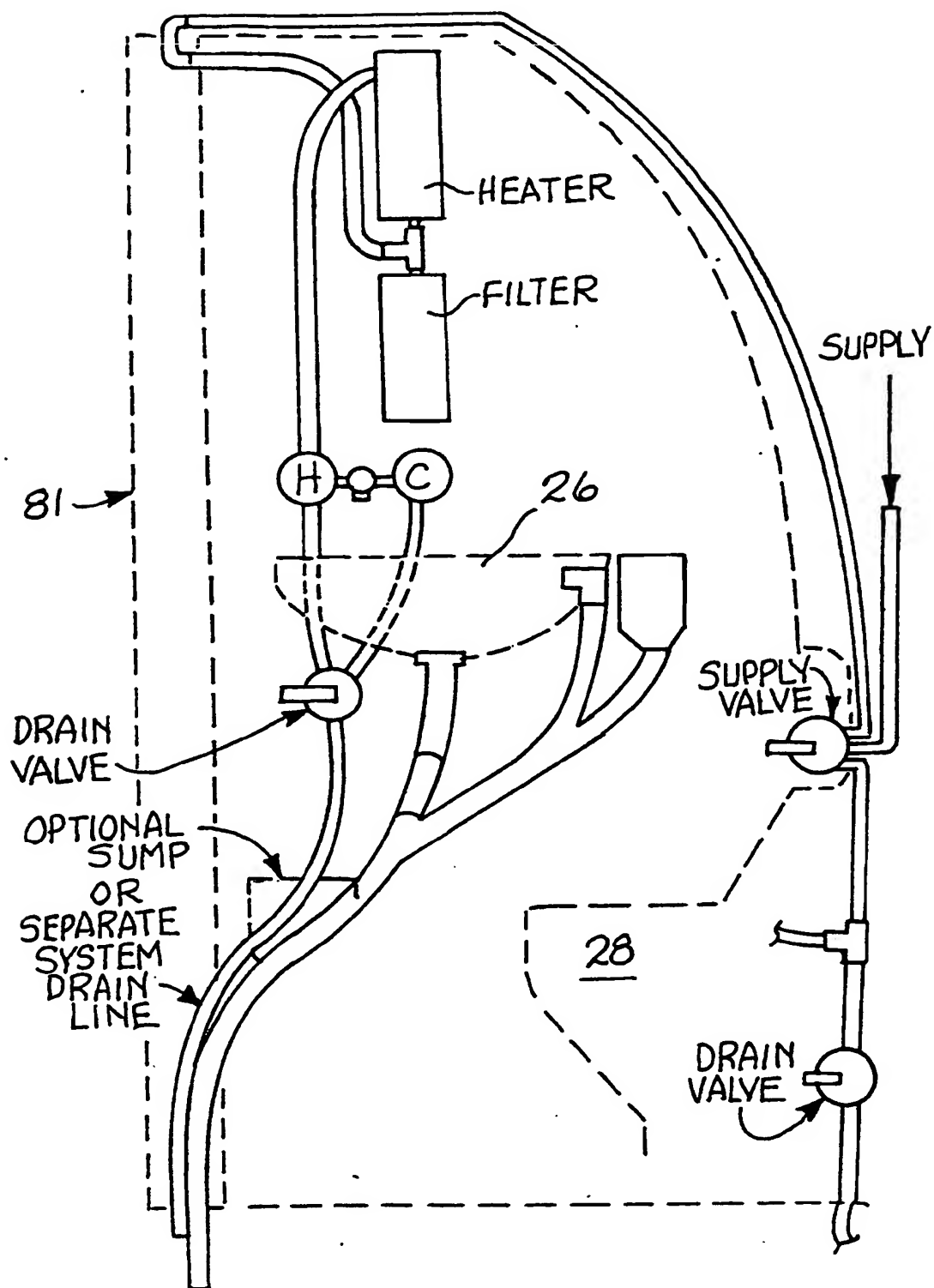


Fig. 10

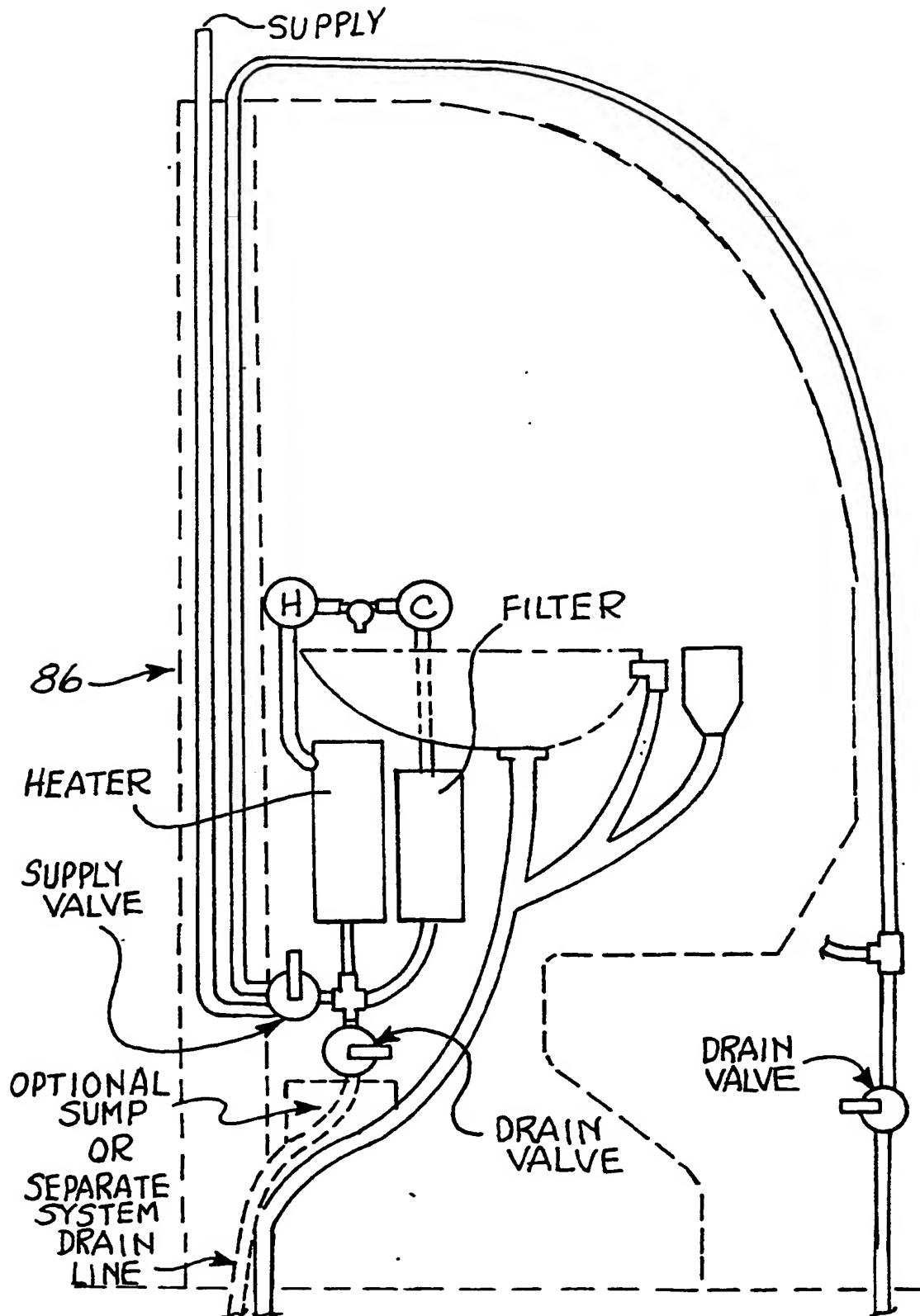


Fig. 11

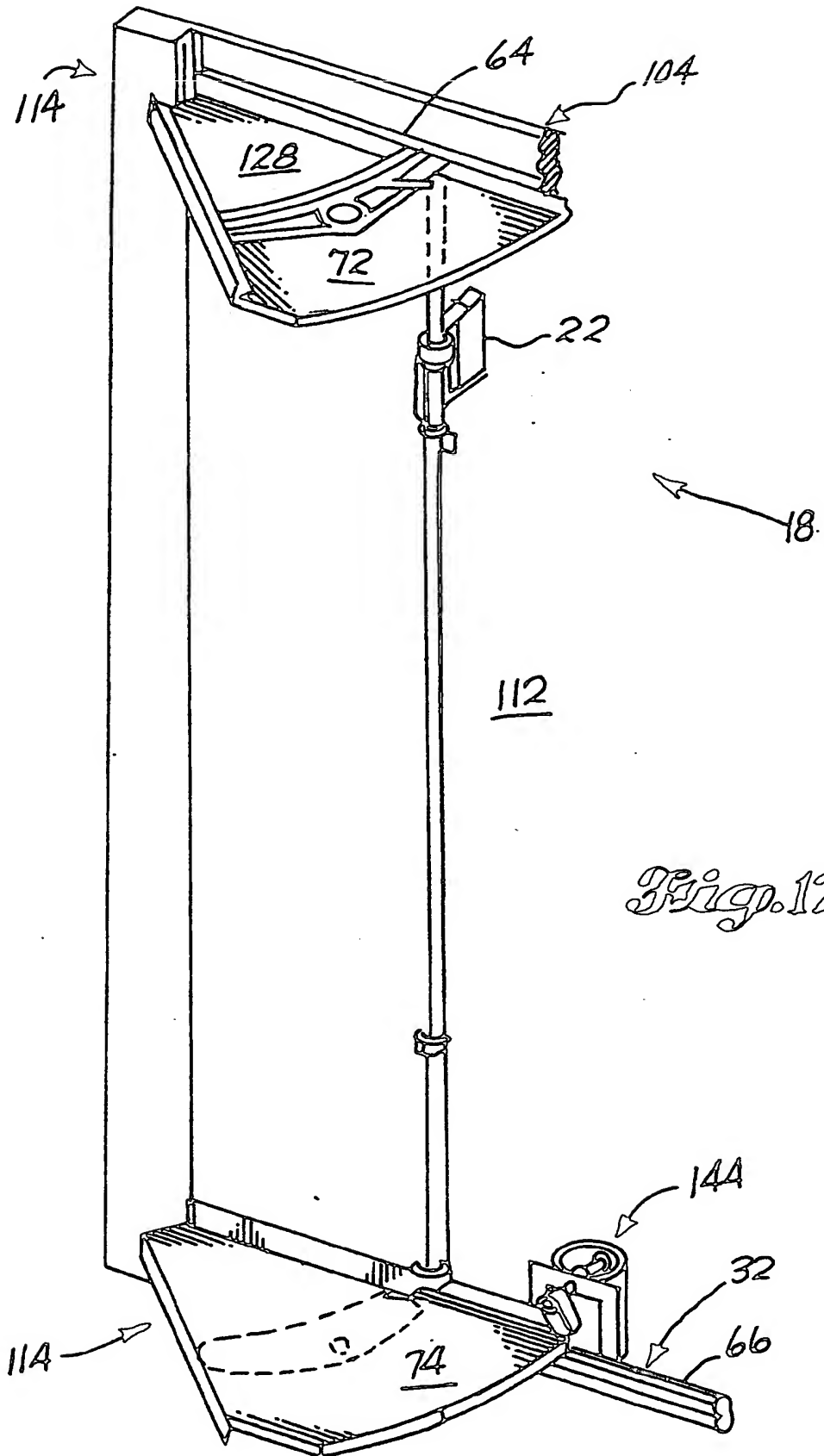
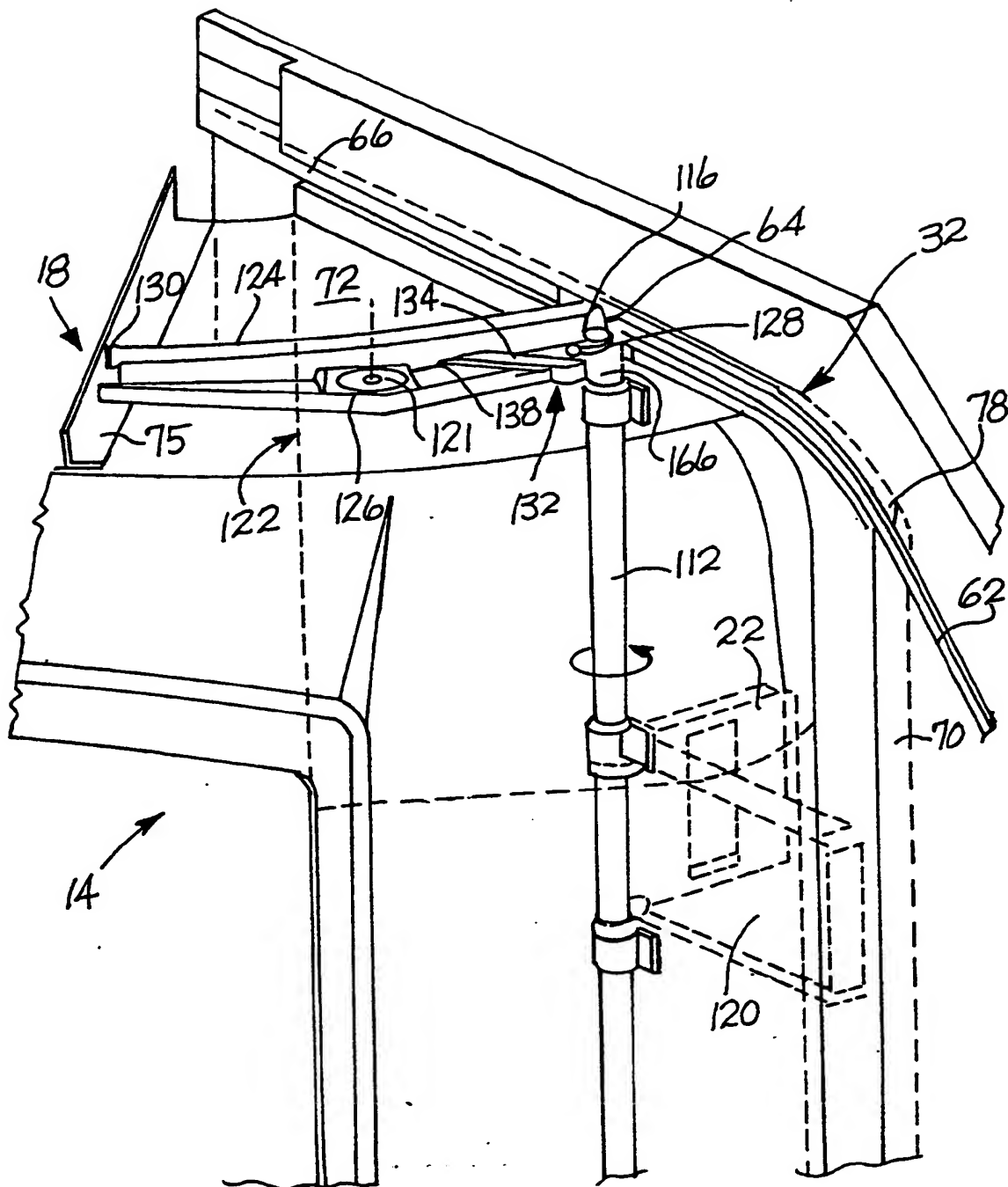
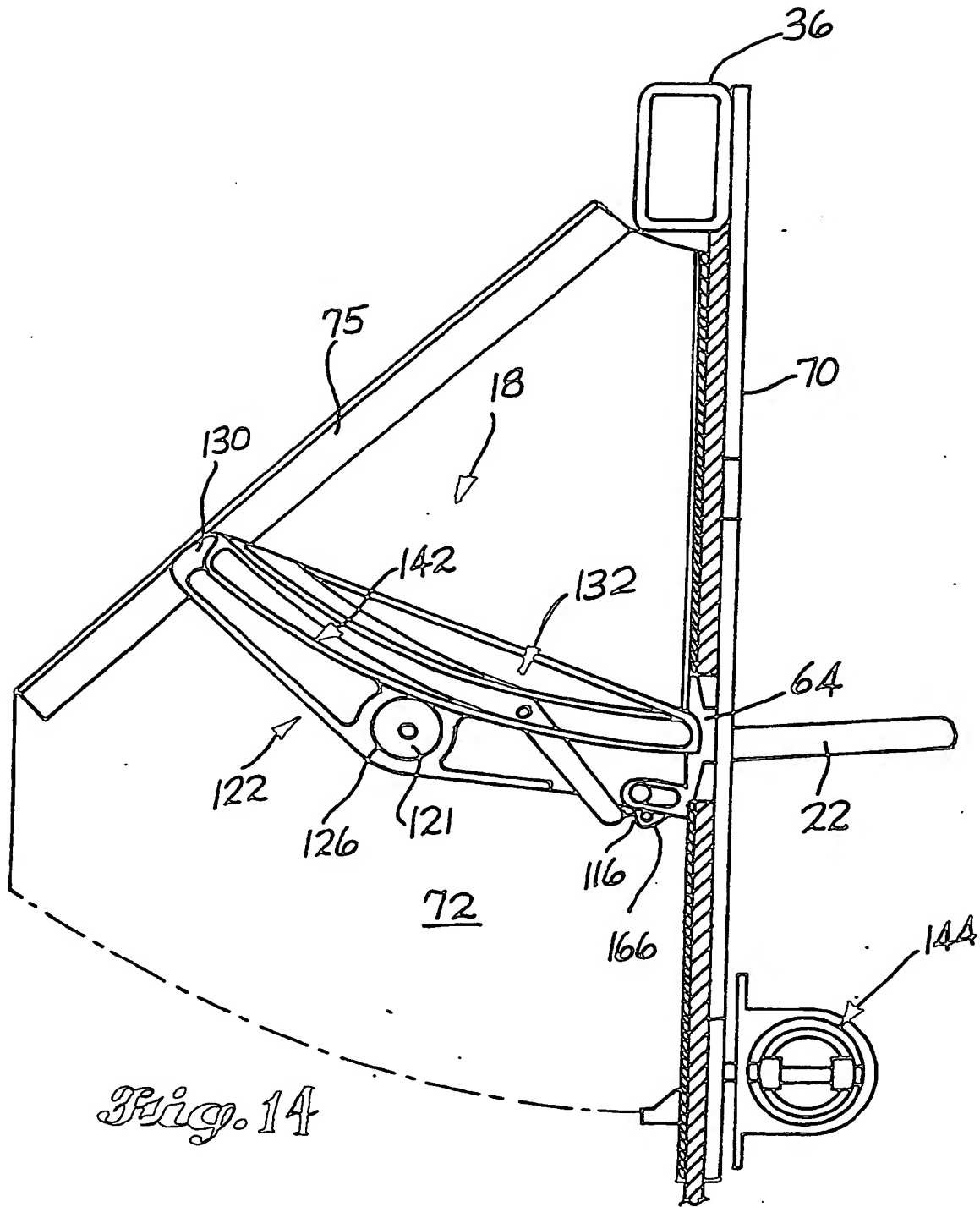


Fig. 12





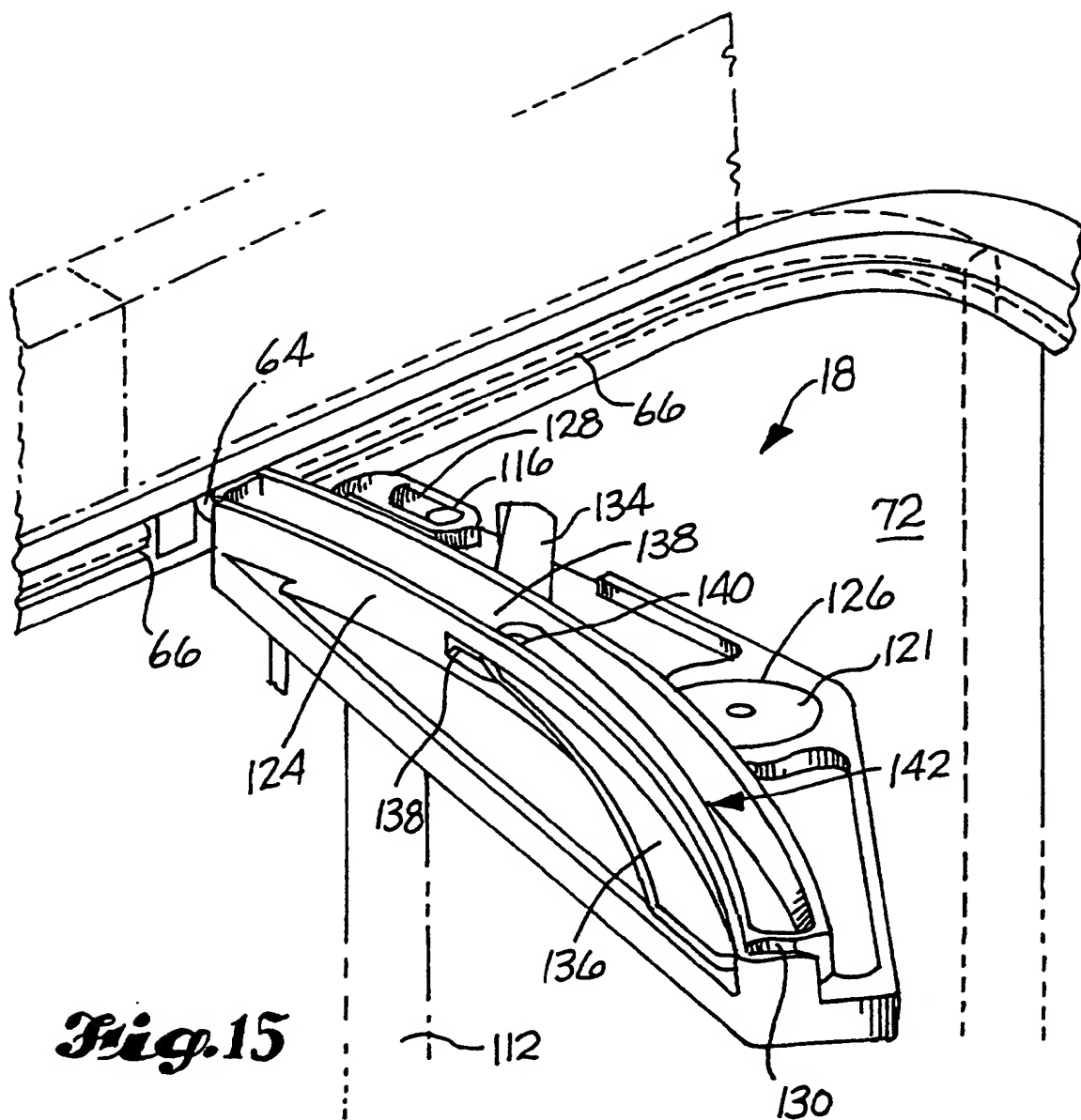


Fig. 15

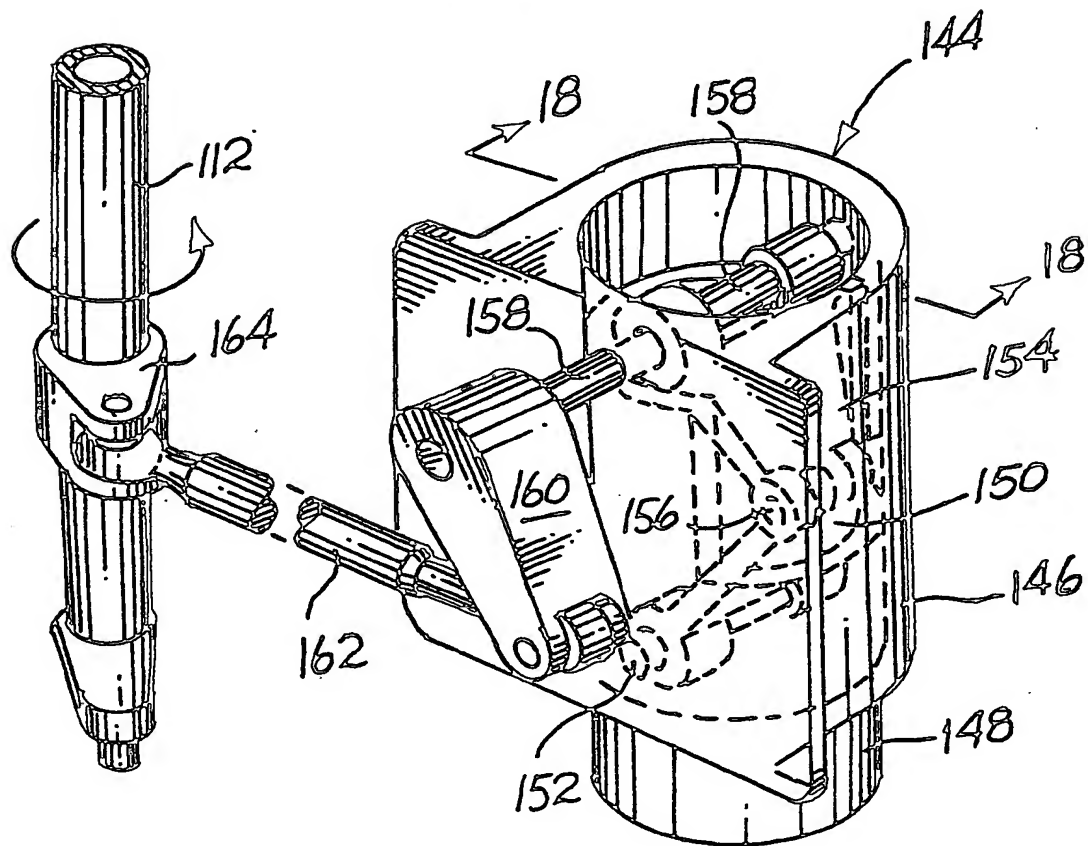
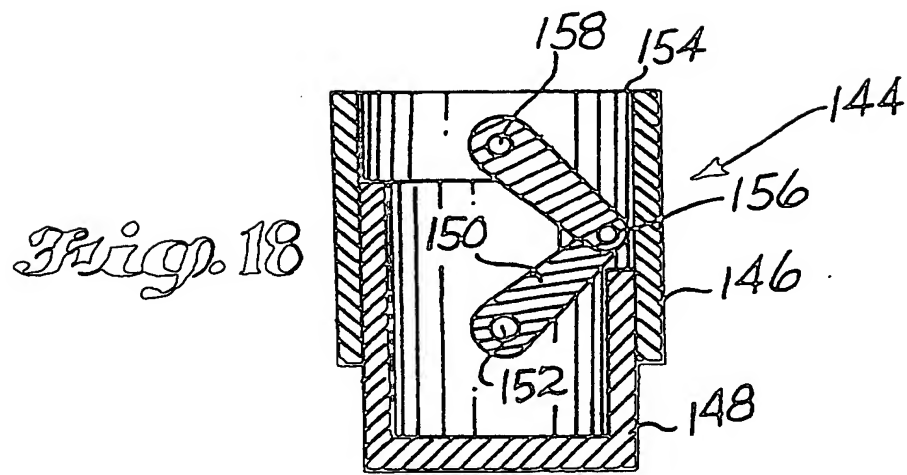


Fig. 16

Fig. 19

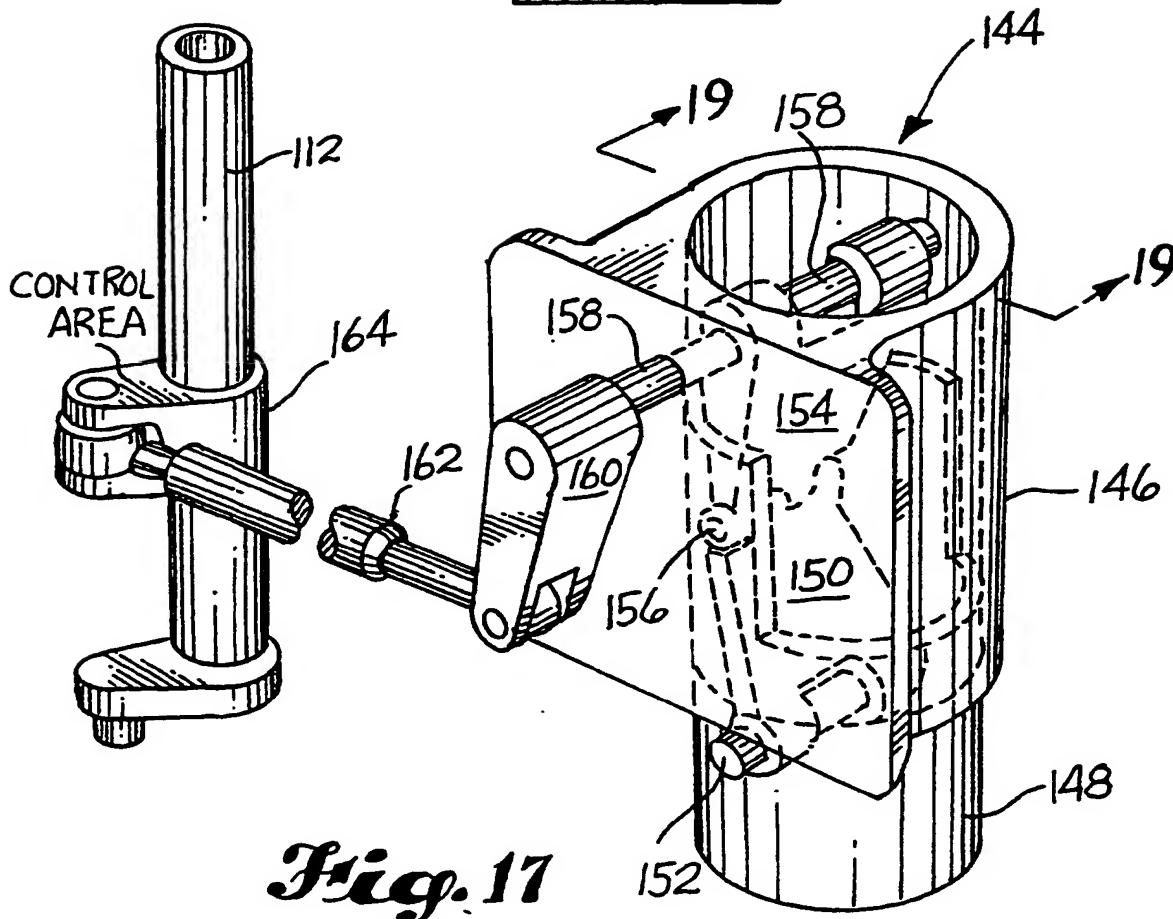
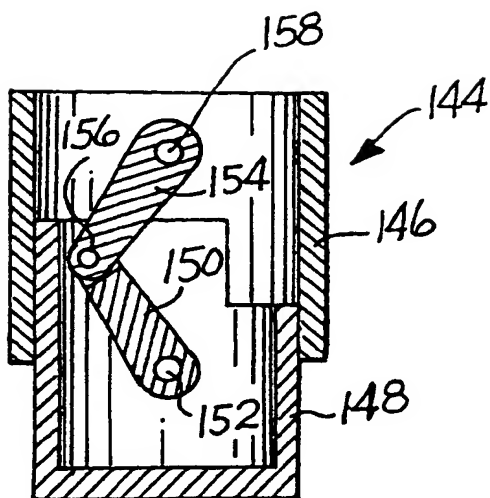


Fig. 17

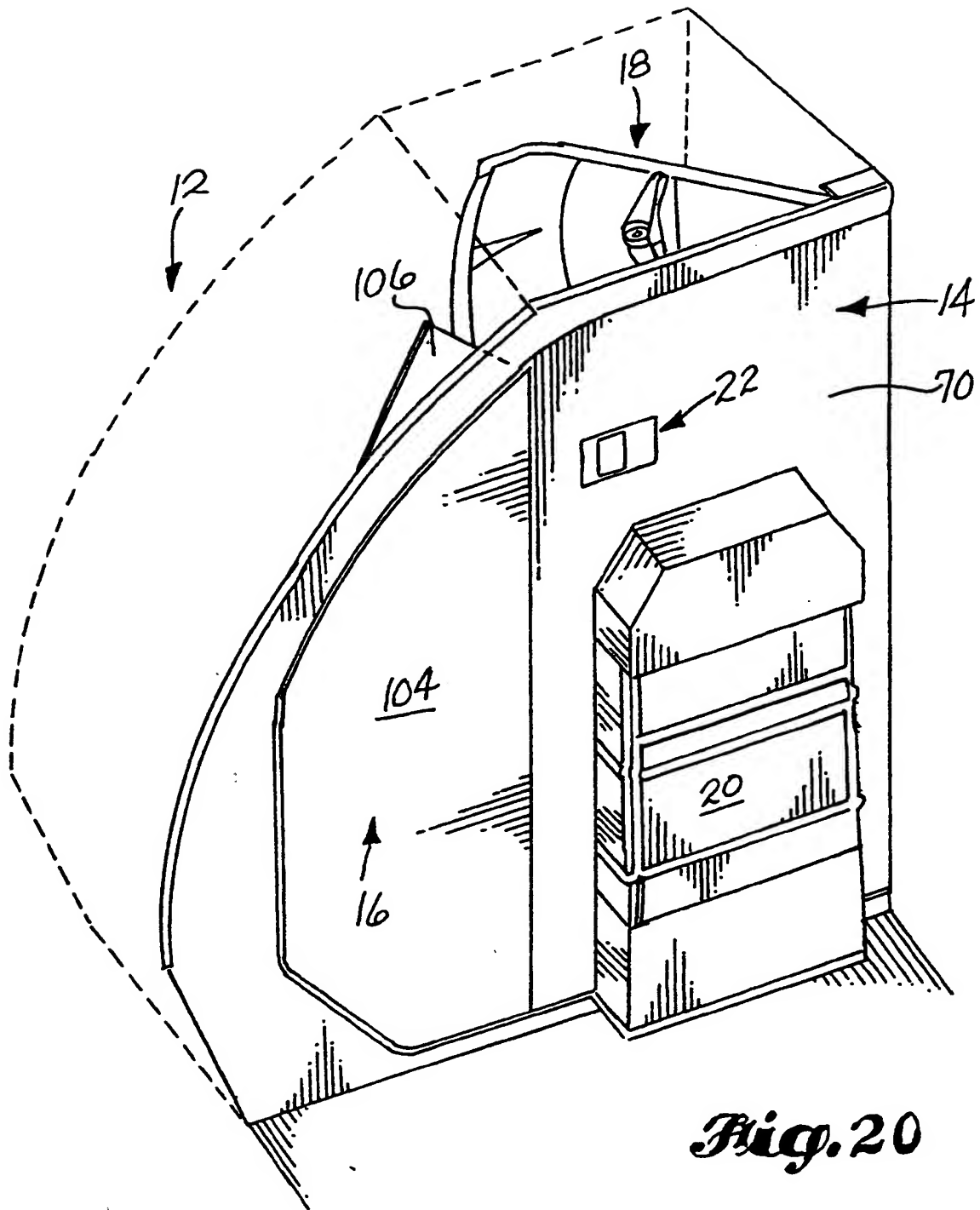


Fig. 20

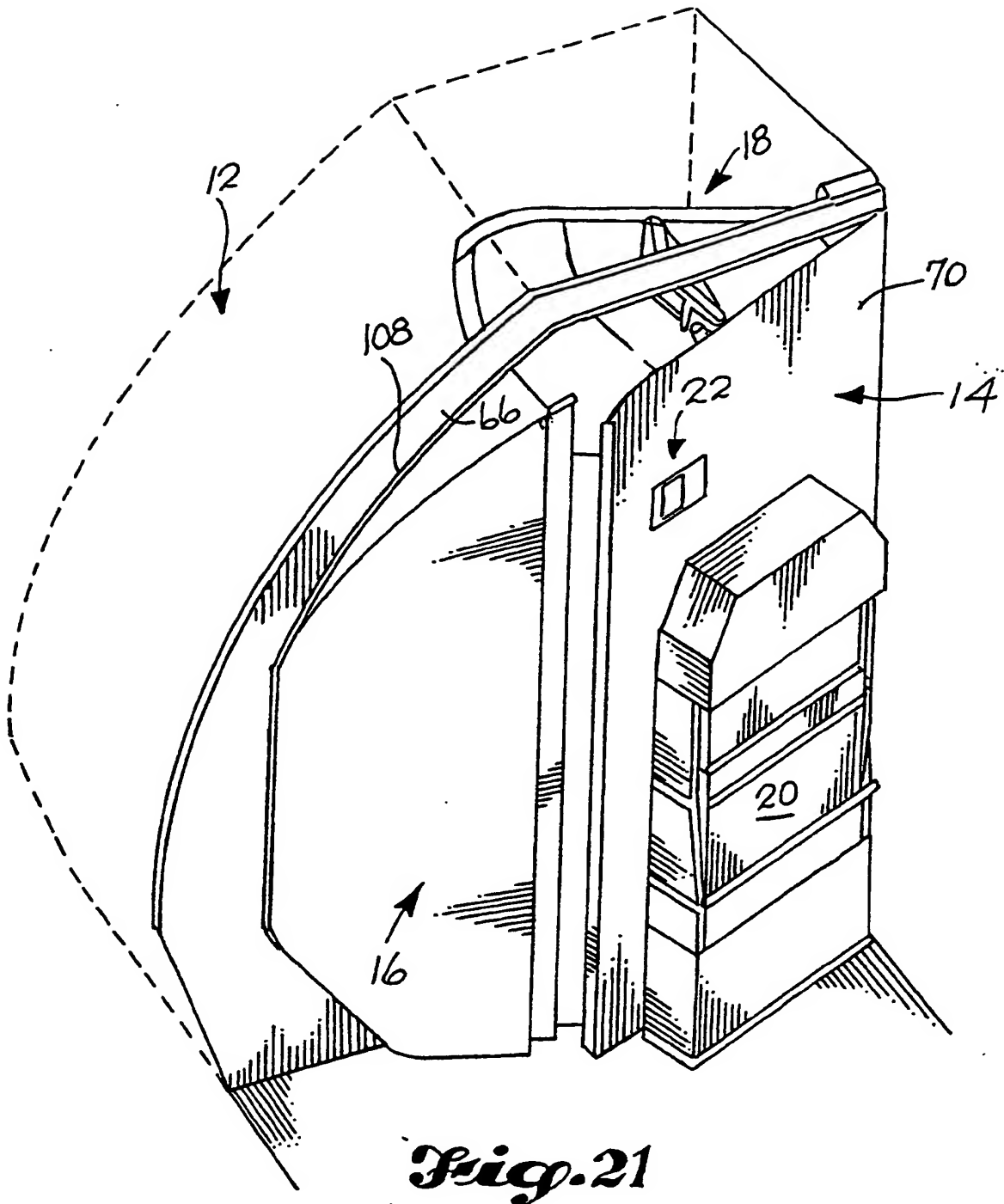


Fig. 21

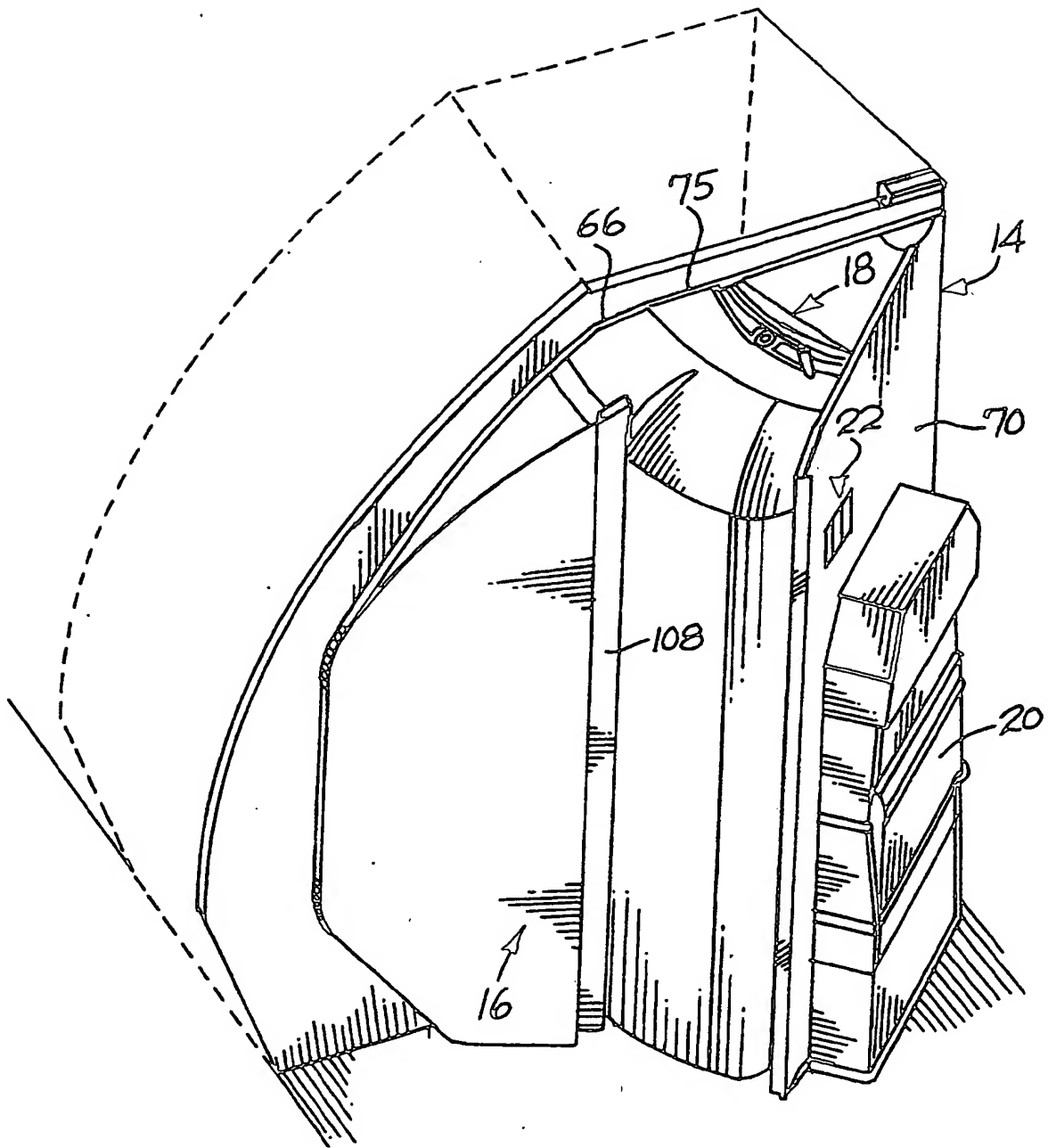


Fig. 22

THE .NET LINK (USPTO)